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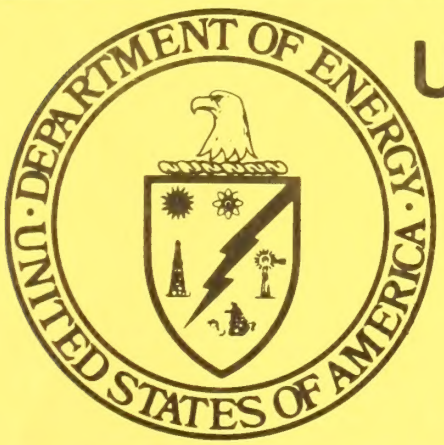
SOLAR/1090-79/01

Monthly Performance Report

ALBUQUERQUE WESTERN-II

JANUARY 1979



U.S. Department of Energy

National Solar Heating and Cooling Demonstration Program

National Solar Data Program

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MONTHLY PERFORMANCE REPORT

ALBUQUERQUE WESTERN NO. 2

JANUARY 1979

I. SYSTEM DESCRIPTION

Albuquerque Western No. 2 is a four-story, 110-unit apartment building in Albuquerque, New Mexico. The solar energy system consists of two independently controlled systems: one system serves domestic-hot-water (DHW) preheating needs, the other serves to preheat hot water used in space heating. Only the space heating system (System II) is described in this report.

System II has an array of tracking collectors with a gross area of 6429 square feet. The array faces south at an angle of 35 degrees to the horizontal. Water is the transfer medium that delivers solar energy from the collector array to storage. Solar energy is stored underground in a 57,000-gallon concrete storage tank. During the space heating season, the heated water from storage is continuously circulated through the building to satisfy the space heating needs for each apartment. When solar energy is insufficent to satisfy the space heating load, auxiliary heating is provided by three inline gas-fired boilers. The system, shown schematically in Figure 1, has three modes of operation.

Mode 1 - Collector-to-Storage: This mode activates when the collector-to-storage pump goes on. This occurs when adequate insolation is available, based on a minimum insolation intensity. Water is pumped through the collector and circulates back to storage.

Mode 2 - Storage-to-Space Heating: This mode activates when the storage-to-space-heating circulation pump is on. This pump runs most of the time unless storage is bypassed during maintenance or emergencies.

Mode 3 - Auxiliary Space Heating: This mode activates when the natural gas-fired boiler system (3 boilers in parallel operation) is required to "top out" the continuously circulating hot water in the space heating system in order to obtain a manually-selected temperature level. This occurs when the solar energy system can no longer meet the preset temperature.

II. PERFORMANCE EVALUATION

INTRODUCTION

The site was occupied during the month of January. The solar collector loop was repaired and put back into operation on January 8. The solar energy system operated for 24 days during the month. Solar energy satisfied 3 percent of the space heating requirements. The solar energy system provided fossil fuel energy savings of 18.7 million Btu, with an electrical energy expense of 5.1 million Btu.

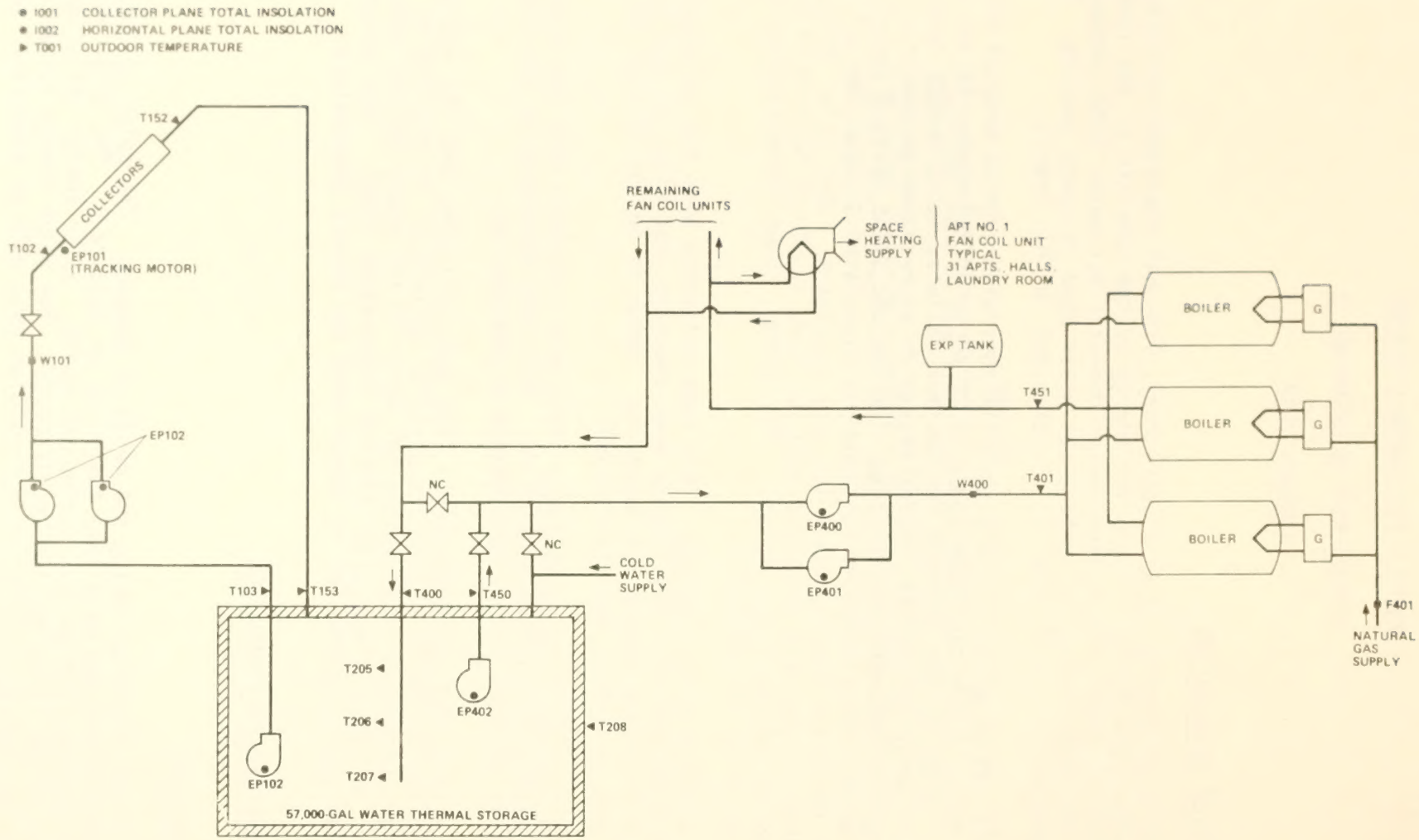

Figure 1. ALBUQUERQUE WESTERN NO. 2 SOLAR ENERGY SYSTEM SCHEMATIC

Because of the high flow rate in the storage to space heating loop, the temperature measurements in the loop do not provide sufficient resolution for energy balance analysis. The auxiliary energy contribution was estimated based on the fossil fuel energy consumed, and the solar energy contribution was computed as the space heating load minus the auxiliary energy contribution. Storage performance was not evaluated because the amount of water actually in storage during the month was unknown.

WEATHER CONDITIONS

During the month, total incident solar energy on the collector array was 209.6 million Btu for a daily average of 1052 Btu per square foot. This was below the estimated average daily solar radiation for this geographical area during January of 1695 Btu per square foot for a south-facing plane with a tilt of 35 degrees to the horizontal. The average ambient temperature during January was 32°F as compared with the long-term average for January of 35°F. The number of heating degree-days for the month (based on a 65°F reference) was 997, as compared with the long-term average of 924.

THERMAL PERFORMANCE

Collector - The total incident solar radiation on the collector array for the month of January was 209.6 million Btu. The collector loop was not activated for the first seven days of the month due to freeze damage suffered in December. During the period the collector loop was operating, the total insolation amounted to 111.9 million Btu. The total collected solar energy for the month of January was 19.9 million Btu, resulting in a collector array efficiency of 10 percent, based on total incident insolation. Solar energy delivered from the collector array to storage was 19.9 million Btu. Operating energy required by the collector loop was 3.4 million Btu.

Storage - Solar energy delivered to storage was 19.9 million Btu. There were 11.2 million Btu delivered from storage to the space heating system. The average storage temperature for the month was 115°F.

Space Heating Load - The space heating system consumed 11.3 million Btu of solar energy and 336.8 million Btu of auxiliary thermal energy (equivalent to 476.5 million Btu of auxiliary fossil fuel energy) to satisfy a space heating load of 348.0 million Btu. The solar fraction of this load was 3 percent. The space heating system consumed a total of 15.7 million Btu of operating energy, resulting in an electrical energy expense of 5.1 million Btu.

OBSERVATIONS

The collector loop operation appeared to require adjustment to the control system. Because of the unknown quantity of water actually in the storage tank, storage performance was not evaluated.

The collected solar energy was set equal to the energy delivered to storage, because of sensor resolution problems in the collector/storage loop. However, the error introduced by this assumption is believed small (less than 10 percent) due to a very high flow rate in the loop. The problem is under investigation by IBM and Boeing.

ENERGY SAVINGS

The solar energy system provided a total fossil fuel energy savings of 18.7 million Btu and an electrical energy expense of 5.1 million Btu.

III. ACTION STATUS

IBM and Boeing are investigating the temperature resolution problem.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: ALBUQUERQUE WESTERN - II ALBUQUERQUE,NM SOLAR/1090-79/01
REPORT PERIOD: JANUARY,1979

SITE/SYSTEM DESCRIPTION:
THE SOLAR SYSTEM FOR THE ALBUQUERQUE WESTERN SITE PROVIDES FOR DOMESTIC HOT WATER (DHW) PREHEATING AND FOR SOLAR ASSISTED HOT WATER SPACE HEATING. THE SITE IS A 4 STORY, 110 UNIT HOUSING COMPLEX FOR THE ELDERLY AND HANDICAPPED. THE SITE'S SOLAR SYSTEM IS IN ACTUALITY, TWO SEPARATE SOLAR SYSTEMS; EACH SYSTEM HAVING ITS OWN COLLECTORS, STORAGE, OPERATING MODES AND CIRCULATION LOOPS. THE SYSTEMS OPERATE INDEPENDENTLY; ONE FOR DHW AND THE OTHER FOR SPACE HEATING NEEDS.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	209.575	MILLION BTU
	32598	BTU/SQ.FT.
COLLECTED SOLAR ENERGY	19.871	MILLION BTU
	3091	BTU/SQ.FT.
AVERAGE AMBIENT TEMPERATURE	32	DEGREES F
AVERAGE BUILDING TEMPERATURE	N.A.	DEGREES F
ECSS SOLAR CONVERSION EFFICIENCY	0.05	
ECSS OPERATING ENERGY	3.402	MILLION BTU
TOTAL SYSTEM OPERATING ENERGY	19.135	MILLION BTU
TOTAL ENERGY CONSUMED	515.555	MILLION BTU

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	N.A.	348.043	N.A.	348.043 MILLION BTU
SOLAR FRACTION	N.A.	3	N.A.	3 PERCENT
SOLAR ENERGY USED	N.A.	11.227	N.A.	11.227 MILLION BTU
OPERATING ENERGY	N.A.	15.733	N.A.	19.135 MILLION BTU
AUX. THERMAL ENERGY	N.A.	336.816	N.A.	336.816 MILLION BTU
AUX. ELECTRIC FUEL	N.A.	N.A.	N.A.	N.A. MILLION BTU
AUX. FOSSIL FUEL	N.A.	476.547	N.A.	476.547 MILLION BTU
ELECTRICAL SAVINGS	N.A.	-5.086	N.A.	-5.086 MILLION BTU
FOSSIL SAVINGS	N.A.	18.712	N.A.	18.712 MILLION BTU

SYSTEM PERFORMANCE FACTOR: 0.644

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM, FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: ALBUQUERQUE WESTERN - II ALBUQUERQUE,NM SOLAR/1090-79/01
REPORT PERIOD: JANUARY,1979

SITE/SYSTEM DESCRIPTION:
THE SOLAR SYSTEM FOR THE ALBUQUERQUE WESTERN SITE PROVIDES FOR DOMESTIC HOT WATER (DHW) PREHEATING AND FOR SOLAR ASSISTED HOT WATER SPACE HEATING. THE SITE IS A 4 STORY, 110 UNIT HOUSING COMPLEX FOR THE ELDERLY AND HANDICAPPED. THE SITE'S SOLAR SYSTEM IS IN ACTUALITY, TWO SEPARATE SOLAR SYSTEMS; EACH SYSTEM HAVING ITS OWN COLLECTORS, STORAGE, OPERATING MODES AND CIRCULATION LOOPS. THE SYSTEMS OPERATE INDEPENDENTLY; ONE FOR DHW AND THE OTHER FOR SPACE HEATING NEEDS.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	221.101 GIGA JOULES
	370186 KJ/SQ.M.
COLLECTED SOLAR ENERGY	20.963 GIGA JOULES
	35099 KJ/SQ.M.
AVERAGE AMBIENT TEMPERATURE	0 DEGREES C
AVERAGE BUILDING TEMPERATURE	N.A. DEGREES C
ECSS SOLAR CONVERSION EFFICIENCY	0.05
ECSS OPERATING ENERGY	3.589 GIGA JOULES
TOTAL SYSTEM OPERATING ENERGY	20.188 GIGA JOULES
TOTAL ENERGY CONSUMED	543.910 GIGA JOULES

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	N.A.	367.185	N.A.	367.185 GIGA JOULES
SOLAR FRACTION	N.A.	3	N.A.	3 PERCENT
SOLAR ENERGY USED	N.A.	11.845	N.A.	11.845 GIGA JOULES
OPERATING ENERGY	N.A.	16.598	N.A.	20.188 GIGA JOULES
AUX. THERMAL ENG	N.A.	355.340	N.A.	355.340 GIGA JOULES
AUX. ELECTRIC FUEL	N.A.	N.A.	N.A.	N.A. GIGA JOULES
AUX. FOSSIL FUEL	N.A.	502.757	N.A.	502.757 GIGA JOULES
ELECTRICAL SAVINGS	N.A.	-5.365	N.A.	-5.366 GIGA JOULES
FOSSIL SAVINGS	N.A.	19.741	N.A.	19.741 GIGA JOULES

SYSTEM PERFORMANCE FACTOR: 1.644

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENERGY COLLECTION AND STORAGE SUBSYSTEM (ECSS)

SITE: ALBUQUERQUE WESTERN - II ALBUQUERQUE,NM
REPORT PERIOD: JANUARY,1979

SOLAR/1090-79/01

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	AMBIENT TEMP DEG-F	ENERGY TO LOADS MILLION BTU	AUX THERMAL TO ECSS MILLION BTU	ECSS OPERATING ENERGY MILLION BTU	ECSS ENERGY REJECTED MILLION BTU	ECSS SOLAR CONVERSION EFFICIENCY
1	8.976	20	0.000	N	0.008	N	0.000
2	8.730	20	0.000	O	0.007	O	0.000
3	6.342	30	0.000	T	0.008	T	0.000
4	7.810	39	0.000		0.009		0.000
5	1.782	36	0.000	A	0.007	A	0.000
6	3.477	39	0.000	P	0.007	P	0.000
7	9.103	35	0.000	P	0.008	P	0.000
8	9.864	29	0.000	L	0.013	L	0.000
9	5.660	32	0.000	I	0.024	I	0.000
10	8.931	33	0.000	C	0.241	C	0.000
11	8.191	37	0.000	A	0.236	A	0.000
12	3.796	42	0.000	B	0.053	B	0.000
13	8.929	33	0.000	L	0.228	L	0.000
14	6.618	30	0.000	E	0.163	E	0.000
15	1.482	40	0.000		0.007		0.000
16	1.896	43	0.000		0.011		0.000
17	1.692	43	0.000		0.006		0.000
18	7.674	43	0.000		0.160		0.000
19	4.039	36	-5.370		0.045		-1.329
20	10.124	33	-2.369		0.253		-0.234
21	7.991	35	0.293		0.220		0.037
22	2.974	36	1.475		0.039		0.496
23	10.491	26	4.273		0.252		0.407
24	6.592	30	0.865		0.145		0.131
25	1.520	33	0.990		0.009		0.652
26	6.648	32	2.265		0.118		0.341
27	9.716	27	1.998		0.219		0.206
28	10.542	26	2.914		0.256		0.276
29	6.353	28	3.710		0.127		0.584
30	10.904	19	0.182		0.258		0.017
31	10.728	23	0.000		0.262		0.000
SUM	209.575	-	11.227	N.A.	3.402	N.A.	-
AVG	6.760	32	0.362	N.A.	0.110	N.A.	0.054
NBS ID	Q001	N113			Q102		N111

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
COLLECTOR ARRAY PERFORMANCE

SITE: ALBUQUERQUE WESTERN - II ALBUQUERQUE,NM SOLAR/1090-79/01
REPORT PERIOD: JANUARY,1979

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	OPERATIONAL INCIDENT ENERGY MILLION BTU	COLLECTED SOLAR ENERGY MILLION BTU	DAYTIME AMBIENT TEMP DEG F	COLLECTOR ARRAY EFFICIENCY
1	8.976	0.000	0.000	21	0.000
2	8.730	0.000	0.000	*	0.000
3	6.342	0.000	0.000	35	0.000
4	7.810	0.000	0.000	46	0.000
5	1.782	0.000	0.000	40	0.000
6	3.477	0.000	0.000	43	0.000
7	9.103	0.000	0.000	39	0.000
8	9.864	0.642	-0.070	35	-0.007
9	5.660	0.525	0.020	37	0.004
10	8.931	7.734	2.275	37	0.255
11	8.191	6.936	1.990	44	0.243
12	3.796	1.312	0.074	49	0.020
13	8.929	7.992	2.305	35	0.258
14	6.618	5.126	1.075	36	0.162
15	1.482	0.000	0.000	43	0.000
16	1.896	0.107	-0.008	46	-0.004
17	1.692	0.000	0.000	48	0.000
18	7.674	5.614	1.192	47	0.155
19	4.039	1.701	0.235	39	0.058
20	10.124	8.796	1.920	36	0.190
21	7.991	6.693	0.745	38	0.093
22	2.974	0.927	-0.316	42	-0.106
23	10.491	9.101	1.724	28	0.164
24	6.592	4.285	0.282	35	0.043
25	1.520	0.000	0.000	*	0.000
26	6.648	8.973	-0.052	34	-0.008
27	9.716	8.016	0.846	29	0.087
28	10.542	9.020	1.839	32	0.174
29	6.353	4.672	-0.087	*	-0.014
30	10.904	9.445	1.965	24	0.180
31	10.728	9.269	1.917	30	0.179
SUM	209.575	111.887	19.871	-	-
AVG	6.760	3.609	0.641	37	0.095
NBSID	Q001		Q100		N100

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
STORAGE PERFORMANCE

SITE: ALBUQUERQUE WESTERN - II ALBUQUERQUE,NM SOLAR/1090-79/01
REPORT PERIOD: JANUARY,1979

DAY OF MONTH	ENERGY TO STORAGE MILLION BTU	ENERGY FROM STORAGE MILLION BTU	CHANGE IN STORED ENERGY MILLION BTU	STORAGE AVERAGE TEMP DEG F	STORAGE EFFICIENCY
1	0.000	0.000	-0.341	91	1.000
2	0.000	0.000	-0.356	90	1.000
3	0.000	0.000	-0.310	90	1.000
4	0.000	0.000	-0.372	89	1.000
5	0.000	0.000	-0.217	88	1.000
6	0.000	0.000	-0.187	88	1.000
7	0.000	0.000	-0.404	87	1.000
8	-0.070	0.000	-0.217	86	3.098
9	0.020	0.000	-0.186	86	-9.186
10	2.275	0.000	3.073	89	1.351
11	1.990	0.000	2.076	95	1.043
12	0.074	0.000	-0.620	96	-8.326
13	2.305	0.000	2.725	98	1.182
14	1.075	0.000	0.649	100	0.604
15	0.000	0.000	-0.928	102	1.000
16	-0.008	0.000	-0.743	100	94.308
17	0.000	0.000	-0.681	99	1.000
18	1.192	0.000	1.177	99	0.988
19	0.235	-5.370	9.539	105	17.751
20	1.920	-2.369	8.669	134	3.386
21	0.745	0.293	2.354	144	3.551
22	-0.316	1.475	-0.551	146	-2.930
23	1.724	4.273	0.275	146	2.639
24	0.282	0.865	1.772	147	9.354
25	0.000	0.990	0.762	150	1.000
26	-0.052	2.265	-0.092	151	-41.951
27	0.846	1.998	1.006	152	3.551
28	1.839	2.914	0.823	155	2.032
29	-0.087	3.710	-2.653	152	-12.086
30	1.965	0.182	0.732	150	0.465
31	1.917	0.000	0.610	151	0.318
SUM	19.871	11.227	27.534	-	-
AVG	0.641	0.362	0.890	115	1.953
NBS ID	Q200	Q201	Q202		N108

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SPACE HEATING SUBSYSTEM

SITE: ALBUQUERQUE WESTERN - II ALBUQUERQUE,NM SOLAR/1090-79/01
REPORT PERIOD: JANUARY,1979

DAY OF MON.	SPACE HEATING LOAD MILLION BTU	SOLAR FR.OF LOAD PCT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	BLDG TEMP DEG. F	AMB TEMP DEG. F
1	16.238	0	0.000	0.452	16.238	N	20.114	-0.008	0.000	N	20
2	18.560	0	0.000	0.452	18.560	O	21.635	-0.007	0.000	O	20
3	14.389	0	0.000	0.453	14.389	T	18.034	-0.008	0.000	T	30
4	10.769	0	0.000	0.453	10.769		13.617	-0.009	0.000		39
5	10.315	0	0.000	0.453	10.315	A	13.129	-0.007	0.000	A	36
6	9.372	0	0.000	0.452	9.372	P	11.888	-0.007	0.000	P	39
7	10.800	0	0.000	0.451	10.800	P	13.841	-0.008	0.000	P	35
8	12.287	0	0.000	0.452	12.287	L	15.533	-0.013	0.000	L	29
9	11.411	0	0.000	0.453	11.411	I	14.547	-0.024	0.000	I	32
10	10.033	0	0.000	0.452	10.033	C	12.780	-0.241	0.000	C	33
11	9.167	0	0.000	0.452	9.167	A	11.665	-0.236	0.000	A	37
12	8.242	0	0.000	0.452	8.242	B	10.508	-0.053	0.000	B	42
13	10.918	0	0.000	0.451	10.918	L	13.843	-0.228	0.000	L	33
14	11.239	0	0.000	0.452	11.239	E	14.232	-0.163	0.000	E	30
15	9.151	0	0.000	0.452	9.151		11.543	-0.007	0.000		40
16	8.454	0	0.000	0.452	8.454		10.749	-0.011	0.000		43
17	9.147	0	0.000	0.452	9.147		11.727	-0.006	0.000		43
18	8.174	0	0.000	0.452	8.174		10.579	-0.160	0.000		43
19	7.591	-71	-5.370	0.937	12.961		19.761	-0.114	-8.949		36
20	11.089	-21	-2.369	0.650	13.458		22.420	-0.417	-3.949		33
21	10.873	3	0.293	0.648	10.580		17.684	-0.384	0.488		35
22	11.388	13	1.475	0.649	9.912		16.521	-0.203	2.459		36
23	15.897	27	4.273	0.649	11.624		19.373	-0.416	7.122		26
24	11.906	7	0.865	0.648	11.041		18.401	-0.309	1.442		30
25	10.655	9	0.990	0.644	9.664		16.107	-0.173	1.651		33
26	11.795	19	2.265	0.637	9.530		15.883	-0.282	3.775		32
27	11.867	17	1.998	0.630	9.869		16.448	-0.383	3.330		27
28	12.148	24	2.914	0.620	9.234		15.390	-0.420	4.857		26
29	13.219	28	3.710	0.563	9.509		15.365	-0.263	6.183		28
30	10.777	2	0.182	0.364	10.595		16.593	-0.262	0.303		19
31	10.174	0	0.000	0.353	10.174		16.721	-0.282	0.000		23
SUM	348.043	-	11.227	15.733	336.816	N.A.	476.547	-5.086	18.712	-	-
AVG	11.227	3	0.362	0.508	10.865	N.A.	15.372	-0.164	0.604	N.A.	32
NBS	Q402	N400	Q400	Q403	Q401		Q410	Q415	Q417	N406	N113

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENVIRONMENTAL SUMMARY

SITE: ALBUQUERQUE WESTERN - II ALBUQUERQUE,NM SOLAR/1090-79/01
REPORT PERIOD: JANUARY,1979

DAY OF MONTH	TOTAL INSOLATION BTU/SQ.FT	DIFFUSE INSOLATION BTU/SQ.FT	AMBIENT TEMPERATURE DEG F	DAYTIME AMBIENT TEMP DEG F	RELATIVE HUMIDITY PERCENT	WIND DIRECTION DEGREES	WIND SPEED M.P.H.
1	1396	N	20	21	N	N	N
2	1358	O	20	*	O	O	O
3	986	T	30	35	T	T	T
4	1215		39	46			
5	277	A	36	40	A	A	A
6	541	P	39	43	P	P	P
7	1416	P	35	39	P	P	P
8	1534	L	29	35	L	L	L
9	880	I	32	37	I	I	I
10	1389	C	33	37	C	C	C
11	1274	A	37	44	A	A	A
12	590	B	42	49	B	B	B
13	1389	L	33	35	L	L	L
14	1029	E	30	36	E	E	E
15	231		40	43			
16	295		43	46			
17	263		43	48			
18	1194		43	47			
19	628		36	39			
20	1575		33	36			
21	1243		35	38			
22	463		36	42			
23	1632		26	28			
24	1025		30	35			
25	236		33	*			
26	1034		32	34			
27	1511		27	29			
28	1640		26	32			
29	988		28	*			
30	1696		19	24			
31	1569		23	30			
SUM	32598	N.A.	-	-	-	-	-
AVG	1052	N.A.	32	37	N.A.	N.A.	N.A.
NBS ID	Q001		N113			N115	N114

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

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